

Atty. Docket No.: CA1427
PATENT APPLICATION

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No.: 09/839,952

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. *(Previously Presented)* A storage apparatus comprising:
 - a gateway, having a processor, a memory, a virtual private network program, a view table, and at least one port operative to connect to a virtual private network, said view table including authorized user addresses, virtual destination addresses corresponding to said user addresses, destination addresses corresponding to said virtual destination addresses, virtual volume IDs corresponding to said user addresses, and volume IDs corresponding to said virtual volume IDs;
 - a plurality of devices that store information, each of said devices further comprising at least one volume;
 - a server;
 - a switch; and
 - an internal network connecting said gateway, said server, said switch, and at least one of said plurality of devices that store information; wherein
 - said gateway receives a data packet for storing, retrieves a virtual destination address and a user address from said data packet, confirms that the user address retrieved corresponds to an authorized user address in the view table, uses the view table to confirm that the virtual destination address corresponds to the user address, reads from said view table a corresponding

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destination address for a particular one of said plurality of devices that store information, and thereupon replaces in said data packet said virtual destination address with said corresponding destination address from said view table; and wherein

said gateway searches in said data packet for a virtual private volume identifier, and if found, thereupon confirms that said virtual private volume identifier corresponds to the user address, reads from said view table a volume identifier corresponding to said virtual private volume identifier, and replaces said virtual private volume identifier in said data packet with said volume identifier.

2. *(Original)* The apparatus of claim 1, wherein said gateway authenticates a source of said data packet based upon a user address in said data packet.

3. *(Canceled)*

4. *(Previously Presented)* The apparatus of claim 1, wherein said virtual private network uses a first protocol and said internal network uses a second protocol, and wherein said gateway translates said data packet from said first protocol to said second protocol.

5. *(Original)* The apparatus of claim 4, wherein said first protocol comprises at least one of IP protocol, ATM, and Fibre channel.

6. *(Original)* The apparatus of claim 4, wherein said second protocol comprises at least one of IP protocol, ATM, and Fibre channel.

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7. *(Canceled)*

8. *(Previously Presented)* The apparatus of claim 1, wherein said gateway receives a data packet being sent to said virtual private network, and thereupon searches in said view table for a destination address retrieved from said data packet, and thereupon reads from said view table a corresponding virtual destination address, and thereupon replaces in said data packet said destination address with said corresponding virtual destination address from said view table.

9. *(Original)* The apparatus of claim 1, wherein said virtual destination address and said destination address are stored in a table.

10. *(Previously Presented)* A storage apparatus comprising:

a server, having a processor, a memory, a virtual private network program, a view table, and at least one port operative to connect to a virtual private network, said view table including authorized user addresses, virtual destination addresses corresponding to said user addresses, destination addresses corresponding to said virtual destination addresses, virtual volume IDs corresponding to said user addresses, and volume IDs corresponding to said virtual volume IDs;

a plurality of devices that store information, each of said devices further comprising at least one volume;

a switch; and

an internal network connecting said server, said switch, and at least one of said plurality of devices that store information; wherein

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said server receives a data packet for storing, retrieves a virtual destination address and a user address from said data packet, confirms that the user address retrieved corresponds to an authorized user address in the view table, uses the view table to confirm that the virtual destination address corresponds to the user address, reads from said view table a corresponding destination address for a particular one of said plurality of devices that store information, and thereupon replaces in said data packet said virtual destination address with said corresponding destination address from said view table; and wherein

said server searches in said data packet for a virtual private volume identifier, and if found, thereupon confirms that said virtual private volume identifier corresponds to the user address, reads from said view table a volume identifier corresponding to said virtual private volume identifier, and replaces said virtual private volume identifier in said data packet with said volume identifier.

11. *(Previously Presented)* The apparatus of claim 10, further comprising a gateway, said gateway having a processor, a memory, and at least one port operative to connect to virtual private network, and wherein said virtual private network uses a first protocol and said internal network uses a second protocol, and wherein said gateway translates said data packet from said first protocol to said second protocol.

12. *(Original)* The apparatus of claim 11, wherein said first protocol comprises at least one of IP protocol, ATM, and Fibre channel.

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13. *(Original)* The apparatus of claim 11, wherein said second protocol comprises at least one of IP protocol, ATM, and Fibre channel.

14-15. *(Canceled)*

16. *(Previously Presented)* The apparatus of claim 10, wherein said server receives a data packet being sent to said virtual private network, and thereupon searches in said view table for a destination address retrieved from said data packet, and thereupon reads from said view table a corresponding virtual destination address, and thereupon replaces in said data packet said destination address with said corresponding virtual destination address from said view table.

17. *(Original)* The apparatus of claim 10, wherein said server authenticates a source of said data packet based upon a user address in said data packet.

18. *(Previously Presented)* A storage apparatus comprising:

a switch, having a processor, a memory, a virtual private network program, a view table, and at least one port operative to connect to virtual private network, said view table including authorized user addresses, virtual destination addresses corresponding to said user addresses, destination addresses corresponding to said virtual destination addresses, virtual volume IDs corresponding to said user addresses, and volume IDs corresponding to said virtual volume IDs;

a plurality of devices that store information, each of said devices further comprising at least one volume;

a server; and

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an internal network connecting said server, said switch, and at least one of said plurality of devices that store information; wherein

said switch receives a data packet for storing, retrieves a virtual destination address and a user address from said data packet, confirms that the user address retrieved corresponds to an authorized user address in the view table, uses the view table to confirm that the virtual destination address corresponds to the user address, reads from said view table a corresponding destination address for a particular one of said plurality of devices that store information, and thereupon replaces in said data packet said virtual destination address with said corresponding destination address from said view table; and wherein

said switch searches in said data packet for a command and a virtual private volume identifier, and if found, thereupon confirms that said virtual private volume identifier corresponds to the user address, reads from said view table for a volume identifier corresponding to said virtual private volume identifier, and replaces said virtual private volume identifier in said data packet with said volume identifier.

19. *(Previously Presented)* The apparatus of claim 18, further comprising a gateway, said gateway having a processor, a memory, and at least one port operative to connect to a virtual private network, and wherein said virtual private network uses a first protocol and said internal network uses a second protocol, and wherein said gateway translates said data packet from said first protocol to said second protocol.

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20. *(Original)* The apparatus of claim 19, wherein said first protocol comprises at least one of IP protocol, ATM, and Fibre channel.

21. *(Original)* The apparatus of claim 19, wherein said second protocol comprises at least one of IP protocol, ATM, and Fibre channel.

22-23. *(Canceled)*

24. *(Previously Presented)* The apparatus of claim 18, wherein said switch receives a data packet being sent to said virtual private network, and thereupon searches in said view table for a destination address retrieved from said data packet, and thereupon reads from said view table a corresponding virtual destination address, and thereupon replaces in said data packet said destination address with said corresponding virtual destination address from said view table.

25. *(Original)* The apparatus of claim 18, wherein said switch authenticates a source of said data packet based upon a user address in said data packet.

26. *(Previously Presented)* A storage apparatus comprising:
a plurality of devices that store information, each of said devices further comprising at least one volume, a processor, a memory, a virtual private network program, a view table, and at least one port operative to connect to a virtual private network, said view table including authorized user addresses, virtual destination addresses corresponding to said user addresses, destination addresses corresponding to said virtual destination addresses, virtual volume IDs corresponding to said user addresses, and volume IDs corresponding to said virtual volume IDs;

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a switch;

a server; and

an internal network connecting said server, said switch, and at least one of said plurality of devices that store information; wherein

at least one of said plurality of devices that store information receives a data packet for storing, retrieves a virtual destination address and a user address from said packet, confirms that the user address retrieved corresponds to an authorized user address in the view table, uses the view table to confirm that the virtual destination address corresponds to the user address, reads from said view table a corresponding destination address for a particular one of said plurality of devices that store information, and thereupon replaces in said data packet said virtual destination address with said corresponding destination address from said view table; and wherein

said particular one of said plurality of devices that store information searches in said data packet for virtual private volume identifier, and if found, thereupon confirms that said virtual private volume identifier corresponds to the user address, reads from said view table for a volume identifier corresponding to said virtual private volume identifier, and replaces said virtual private volume identifier in said data packet with said volume identifier.

27. *(Previously Presented)* The apparatus of claim 26, further comprising a gateway, said gateway having a processor, a memory, and at least one port operative to connect to a virtual private network, and wherein said virtual private network uses a first protocol and said internal

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network uses a second protocol, and wherein said gateway translates said data packet from said first protocol to said second protocol.

28. (*Original*) The apparatus of claim 27, wherein said first protocol comprises at least one of IP protocol, ATM, and Fibre channel.

29. (*Original*) The apparatus of claim 27, wherein said second protocol comprises at least one of IP protocol, ATM, and Fibre channel.

30-31. (*Canceled*)

32. (*Previously Presented*) The apparatus of claim 26, wherein at least one of said plurality of devices that store information receives a data packet being sent to said virtual private network, and thereupon searches in said view table for a destination address retrieved from said data packet, and thereupon reads from said view table a corresponding virtual destination address, and thereupon replaces in said data packet said destination address with said corresponding virtual destination address from said view table.

33. (*Previously Presented*) The apparatus of claim 26, wherein said at least one of said plurality of devices that store information authenticates a source of said data packet based upon a user address in said data packet.

34. (*Previously Presented*) A method for managing storage, comprising:
receiving a data packet;

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retrieving a virtual destination address and a user address from said data packet;

using a view table to confirm that the user address retrieved corresponds to an authorized user address in the view table, the view table including authorized user addresses, virtual destination addresses corresponding to said user addresses, destination addresses corresponding to said virtual destination addresses, virtual volume IDs corresponding to said user addresses, and volume IDs corresponding to said virtual volume IDs;

using the view table to confirm that the [[the]] virtual destination address retrieved from said data packet corresponds to the user address;

reading from the view table a corresponding destination address for a particular one of a plurality of devices that store information;

replacing in said data packet said virtual destination address with said corresponding destination address from the view table;

retrieving a virtual private volume identifier from said data packet;

confirming that the virtual private volume identifier retrieved from said data packet corresponds to the user address;

reading from said view table a corresponding private volume identifier of a volume in one of said plurality of devices that store information; and

replacing in said data packet said virtual private volume identifier with said corresponding private volume identifier.